A FEW

REMARKS ON TRACHEOTOMY;

WITH CASES.

BY

T. R. JESSOP, F.R.C.S.,

LECTURER ON PHYSIOLOGY AT THE LEEDS SCHOOL OF MEDICINE,
SURGEON TO THE LEEDS PUBLIC DISPENSARY, ETC.

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THERE are few occasions for surgical interference where an opportunity is afforded of exhibiting the benefits to be derived from prompt action in so striking a manner as those on which the surgeon is called upon to perform the operation of tracheotomy. Usually, whatever may be the ultimate result, the *immediate* relief is so apparent that the hopes of all interested are at once raised to the highest pitch. It occasionally happens that help comes too late, that the opening into the air-passages is delayed too long, or that, suffocation suddenly taking place, there is not time to obtain the aid of the surgeon before the patient is dead. I have more than once heard the surgeon, on finding that respiration had stopped, and that the heart had ceased to beat, exclaim, as he left the bedside, "Had I been here five minutes earlier, I might have saved the life by opening the trachea."

One of the cases related in this paper will show the possibility of restoring animation under circumstances which may at first sight seem hopeless.

We have ceased to be astonished at the remarkable instances recorded of life brought back, as it were, to bodies apparently dead from long submersion in water. We should hold ourselves blameworthy if we neglected, in any case of drowning, when the body is known to have been alive half-an-hour before, to make diligent use of artificial respiration, and all those other means which are now so universally and effectually applied. And when we bear in mind that in many cases of persons suffocated, the conditions are in no way different from those in the drowned, except that the nature of the obstruction in the air-passages requires that an opening in the trachea shall be made—when we bear in mind that in both cases the primary cause of death is

the stoppage to the interchange of gases in the cells of the lungs, and that *death does not actually take place for some considerable period after that interchange has ceased*—that, namely, respiration, and in consequence circulation, may be arrested and kept at a stand-still over a considerable space of time, before that state is arrived at, whatever it may be, when vitality has irrevocably fled,—it is difficult to understand why in the one case we should turn away regretting simply that we were not summoned at an earlier period, whilst in the other we diligently persevere with our remedial agents until our efforts are crowned with success or all hopes of restoration have gone. That reward will sometimes wait upon perseverance is sufficiently proved by the following case, which occurred to me during my house-surgeoncy at the Leeds General Infirmary.

Case 1.—Mary M'G——, aged fourteen, a street-dancer and stilt-walker, from Manchester, was admitted into the Leeds General Infirmary, under the care of the late Mr. Samuel Smith, on the 30th of May, 1862, in consequence of hypertrophy of the thyroid body, attended by some dyspnœa which at times assumed a somewhat violent character, and was then accompanied by noisy inspiration. A careful examination failed to elicit any other cause for the paroxysms of difficult breathing than the enlargement of the thyroid body. The hypertrophy, though marked, was not excessive, was of the usual simple character, unaccompanied by exophthalmos or heart-murmur, involved all three lobes equally, and the middle one lay apparently in its usual position across the front of the upper part of the trachea. The disease had commenced about a year before her admission, and had steadily advanced, the difficulty of breathing keeping pace with the enlargement of the neck.

During the first fortnight of her stay in the hospital an iodine lotion was applied to the neck, and the tincture of iodine given internally, without any apparent result. The size of the thyroid was undiminished, and the difficulty of inspiration remained the same. As the attacks had never been of an alarming character, no extraordinary precautions were taken.

About half-past six on the morning of June 13th, exactly a fortnight after the patient's admission, the night-nurse came to my room—in compliance with my requirement, that every nurse should inform me when any of her patients died, whether expectedly or unexpectedly—and, rousing me, said: "Mary

M'G—— has just died in a fit, sir." I lost no time in reaching the ward in which the patient was. My bedroom, however, was at one end of the building, and the patient was at the opposite end, and on the floor above me. On arriving at the bedside, I found the girl duly "laid out," and surrounded by the large screen which was made use of for isolating the dead. The face was livid, and no sign of life was manifest. Feeling certain that the patient must have been suffocated, I ran to the operation-room, which is situated in the centre of the building, and on the floor above that on which the patient lay, procured the necessary instruments, ran back to the ward, had the body lifted from the bed on the floor, which had been made there owing to the crowded state of the house, and placed upon another patient's bed ; and I then opened the trachea. The depth of the wound was so great that the ordinary tubes were found to be of no use. I therefore held the wound open by means of a pair of long forceps introduced, while assistants, who had in the meantime been summoned, performed the movements for artificial respiration, as directed by Dr. Marshall Hall. Air entered, and was expelled freely with each set of movements. The body remained quite warm, and every now and then, at very long intervals of many minutes, I thought I could detect a slight fluttering of the heart; but, with these exceptions, no sign of life was manifested until a few minutes before eight o'clock—nearly an hour and a-half after I was called, and, according to the nurse's statement, fully an hour and three-quarters after the girl was supposed to have died,—when a single distinct and convulsive inspiration was observed. Shortly, in from forty to sixty seconds, another followed ; and subsequently breathing became by slow degrees established, and with it pulsation at the heart and wrist. The artificial respiration was continued until about 8.30, when it was no longer needed. The patient remained perfectly unconscious all that day and the next, and became able to recognise those around her only at about the end of forty-eight hours.

As soon as the immediate danger was over, a silversmith was directed to make a special tube, of twice the ordinary length ; and in the meantime the wound was kept open by an assistant with a pair of long forceps. Her recovery was uninterrupted. At the end of a week, without any further treatment having been adopted, the enlargement of the thyroid had diminished very considerably. In three weeks she sat up, and at the end of

two months the thyroid body was only slightly larger than natural; and yet the trachea was so deep that the long special cannula alone would reach it.

When the canula was removed to be cleaned, the opening contracted so rapidly that it was found necessary to have a second tube made, in order that it might be introduced immediately on the withdrawal of the first. On August 30th, the introduction of the clean canula having been neglected on the withdrawal of the obstructed one, the wound was found to have contracted so much that it became necessary to enlarge it with a bistoury before the tube could be re-introduced. In consequence of the difficulty experienced each time the tube was cleaned, it became necessary that the girl should be kept in the hospital; and accordingly she was hired as a cleaner, the duties of which office she continued to perform until the end of 1865, when, after a sojourn of three years and a half, she left the hospital, still wearing the tube. I often tried to induce her to give up the use of the tube, but in vain, as the distress of breathing invariably recurred, when in a very few minutes the opening narrowed, and then it became a matter of some difficulty to re-introduce the tube. There was no appearance of disease on laryngoscopic examination, and, on closing the orifice of the tube, the patient could speak with a bass voice and breathe with tolerable facility.

Cases of threatened suffocation every now and then occur in which, from the nature of the disease, or from the exhausted condition of the patient, the propriety of prolonging his sufferings, or of increasing his distress, for the sake of gaining a short addition to his life by the performance of the operation of tracheotomy, may be fairly questioned by the surgeon; and it becomes a matter of much difficulty to decide whether we shall allow our patient to die at once, or we shall hold out a pain-inflicting hand, which can at the best but give him a short respite. In such cases we shall do well, I think, to take into our consideration not only the number of days we are likely to add to our patient's life, but also the probable *mode of his death*. The struggle for breath in the suffocated so completely monopolises his every thought, and is so distressingly painful for relations and friends to witness, that it is very desirable, to say the least, we should if possible substitute a calm and quiet departure—one more suited to

the solemn and momentous occasion. And it will sometimes happen, as in the first of the next two cases, that the prolongation of life will far surpass our expectations.

Case 2.—Henry R——, aged thirty-four, was placed under my care by a benevolent, though distant, relative of his, in May, 1865. In November, 1864, he began to suffer from cough, which was soon afterwards attended by copious expectoration, night sweats, great loss of flesh, and hoarseness of voice—symptoms which, attributed to phthisis, had been met by the administration of cod-liver oil and medicines. When I first saw him he was very thin, and looked extremely ill. I could not detect any sign of phthisis on examining his chest; but his symptoms pointed unmistakably, as I thought, to that disease. He was almost aphonic, and yet the vocal cords appeared healthy. In the following month (June) I observed, by means of the laryngoscope, a swelling posterior to, and on the right of, the larynx, which displaced that organ towards the left of the middle line; and, on examining the neck externally, a distinct thickening could be felt deeply situated on the right side of the larynx. From this time the growth rapidly enlarged, projecting outwardly at the side and on the front of the neck, and encroaching upon the cavity of the larynx within. His strength daily diminished, and his breathing became more and more impeded. On the 23rd of July, about six weeks after the first detection of the disease, immediate death by suffocation was averted by my opening the trachea. The relief to the urgent symptoms was of course decided; and for some weeks he positively gained flesh and strength, was able to sit up, and passed his time in tolerable comfort. Meantime the tumour rapidly enlarged; and towards the end of October his strength visibly failed. He died from exhaustion on Nov. 9th, having survived the operation nearly sixteen weeks. The tumour, which was found to consist of encephaloid infiltration of all the tissues in the neighbourhood of the larynx, and formed a very large and prominent mass on the side and front of the neck, was exhibited by me before the Pathological Society in 1866.

Case 3.—Richard D——, aged fifty-two, applied to me on the 31st day of August, 1865, on account of difficult breathing, which had for some months been gradually increasing. He was spare and sallow. On laryngoscopic examination the

epiglottis and borders of the larynx were found to be thickened and ulcerated, and to the touch they felt hard and rigid. The vocal cords were not implicated in the disease, but were much limited in their movements. Inasmuch as he stated that he had contracted syphilis ten years before, although I felt convinced, from the situation, the appearance, and the feel of the diseased parts, that the affection would prove to be epithelioma, I deemed it right to put him at once under treatment suited to that disease. I accordingly prescribed mercurial ointment to the arms, and ten grains of iodide of potassium in two-ounce doses of the syrup of sarsaparilla three times daily, and swabbed the parts on alternate days with a strong solution (ten grains to the ounce) of nitrate of silver.

The disease continued to advance, and the breathing became daily more embarrassed, until the 26th of September, when, as suffocation became evidently imminent, I opened the trachea. He rapidly improved, and at the end of a week was able to sit up. He now, however, began to experience considerable difficulty in swallowing food, and more especially liquids, which almost invariably found their way into the trachea, and were expelled in astonishingly large quantity through the tube. Whilst taking some broth on the 18th of October—twenty-two days after the operation—he suddenly died. A post-mortem examination could not be obtained, but on removing the tube it was found partially blocked up with a piece of meat.

Widely different from the last are the cases where a foreign body has accidentally slipped into the windpipe. In these, the surgeon does not hesitate, after having failed to extract the offending substance by other means, to open the trachea without delay.

The following case presents some points of interest: the somewhat unusual length of time which elapsed between the entrance of the foreign body into the larynx and the operation, and again between the operation and the escape of the foreign body; the little mischief set up by the long sojourn of the nutshell in so delicate an organ as the larynx, when that organ was no longer being made use of; and, lastly, the advantage of making a large opening when operating for the removal of foreign substances.

Case 4.—On the 4th of June, 1867, I was asked by Dr. Young, of Headingley, near Leeds, to see with him George R——, aged four years, who, on the afternoon of the 2nd of June, whilst laughing at play, had accidentally drawn into the larynx a portion of nutshell. A violent paroxysm of difficult breathing was the immediate consequence; but as this gradually passed off, and the little fellow resumed his play, little was thought of it. During the night and day following, occasional attacks of dyspnœa occurred, but always passed away in a short time. Early on the morning of the 4th of June, however, he was seized with a paroxysm of more than usual severity, and his voice dropped to a whisper—a condition of things which hourly increased, and was evidently about to culminate in complete suffocation when I saw him at midday. With Dr. Young's assistance, I made a large opening in the trachea, and inserted a correspondingly large tube.

Immediately after the operation the child's condition seemed to be so critical that we deemed it prudent not to make any attempt to remove the nutshell, which had evidently stuck fast in the larynx, and offered, therefore, no obstruction to the ingress and exit of air. On the following day the child rapidly improved, and suffered little apparently from the effects of the operation. On closing the orifice of the tube he was unable to breathe or speak, and as it was evident, from the resistance he offered to any examination, that it would be necessary to administer chloroform before making any attempt at the removal of the foreign substance, I preferred waiting, in the absence of any sign of irritation in the larynx, until he was quite convalescent.

On the afternoon of June 22nd—eighteen days after the operation—he was seized with a violent fit of coughing, which terminated in the expulsion through the tube of the nutshell—a piece consisting of about one-fourth of the shell of an ordinary Barcelona nut. Immediately after the expulsion of the foreign body he was able to speak with a rough voice on closing the orifice of the tube. In order to facilitate the recovery of the larynx from any damage it might have sustained from the long irritation to which it had been subjected, I kept the tube in until the 2nd of July. The child's recovery was afterwards uninterrupted.

In conclusion, I have two suggestions to offer for the improvement of tracheotomy tubes as ordinarily constructed. A remark commonly made after performing the operation is, "How much deeper the trachea is than it seems to be!" We may go further with our reflections, and add, "How much deeper the trachea is in the living than in the dead!" In private practice, where the patient resides at a distance from the surgeon, it is no unusual circumstance to be told, on making the morning visit, that the patient, especially if it be a child, has died after a violent fit of coughing during the night. And if the throat be examined, it will not unfrequently be found that the tube has been forced out of the trachea, and is lying irregularly in the wound; that, in fact the child has died suffocated, because the tube was only just long enough to reach the trachea, and has therefore become readily displaced during the act of coughing, or in swallowing. The ordinary tracheotomy tubes would seem to be made to correspond with the apparent, and not with the actual depth of the trachea—to reach the trachea of the dead and not of the living. Those I am in the habit of using are nearly half as long again as the ordinary tubes, and I find them very advantageous. I had them made after losing two children in the way I have described above.

My second suggestion—the principle of which is, I believe recognised, but is not sufficiently appreciated by instrument makers—is, that the two blades of the outer canula should be made so that they lie in *close apposition* at their distal extremities, and are separated only by the introduction between them of the inner canula.

By the adoption of this means the most difficult step in the operation of tracheotomy—viz., the introduction of the canula through the slit in the trachea—will be much facilitated.

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